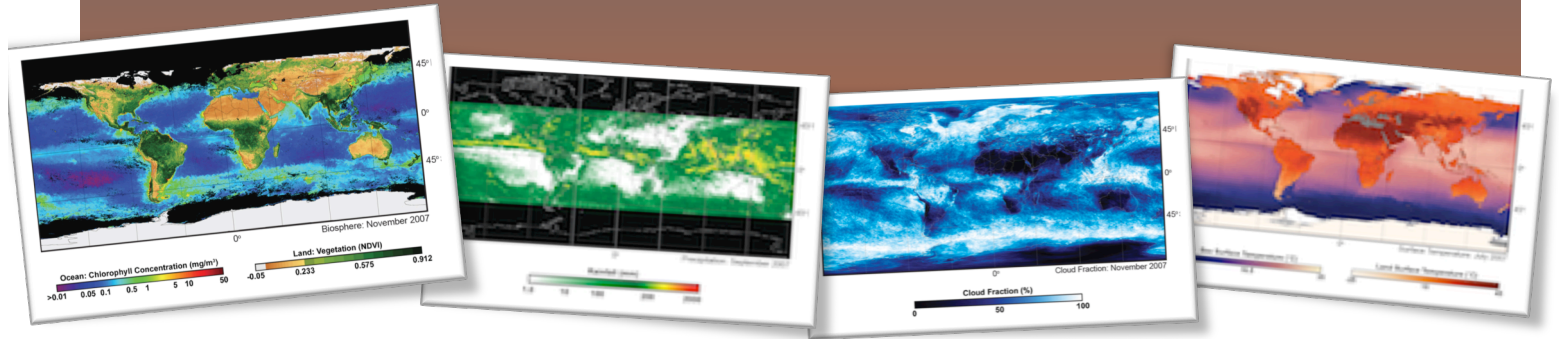


MY NASA DATA- GLOBE Digital Earth System Poster

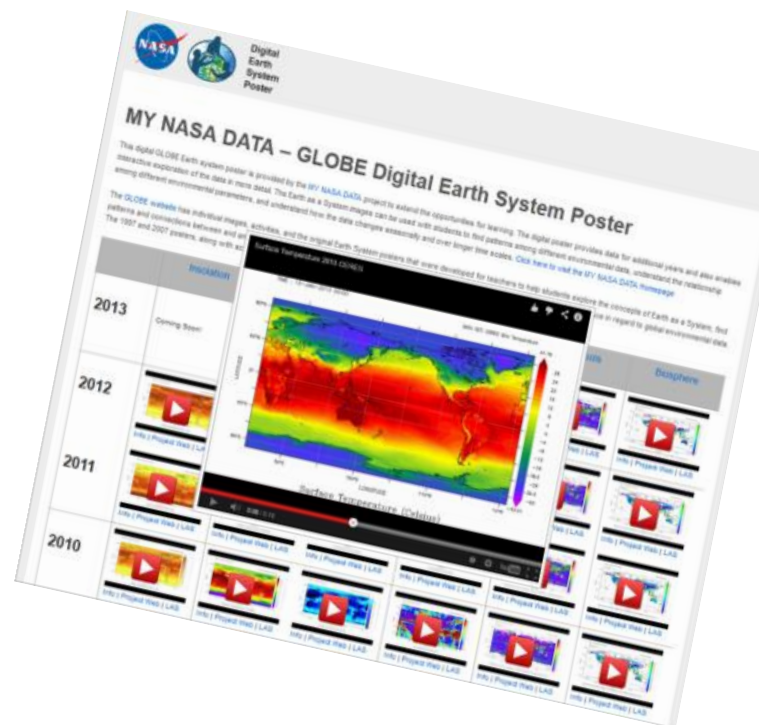
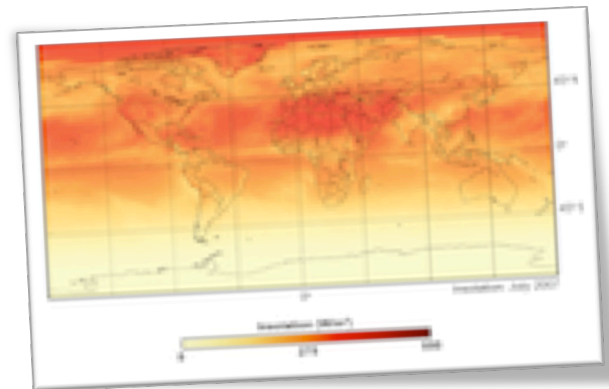
<http://mynasadata.larc.nasa.gov/globe/>

Implementing the NGSS Grades 6-8

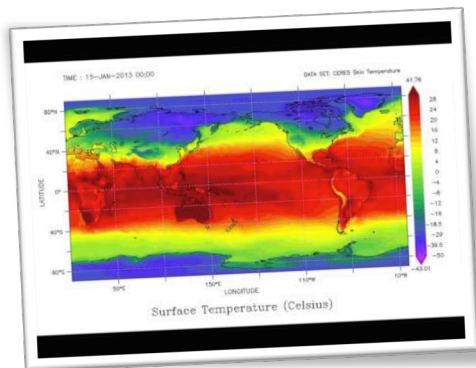


In the Classroom:

The GLOBE Digital Earth System Poster was designed to provide teachers and students an opportunity to explore data and provide them with the ability to identify relationships between/among the different components of the Earth system. It allows students to visualize how the different variables change throughout the course of a year, make comparisons between years to establish cause/effect relationships for a specific variable, identify patterns and determine relationships between variables. It can be used as a tool to implement the NGSS Science Practices, Disciplinary Core Ideas, and Crosscutting Concepts as they relate to the performance expectations. Activities ideas are provided for each of the identified performance expectations.



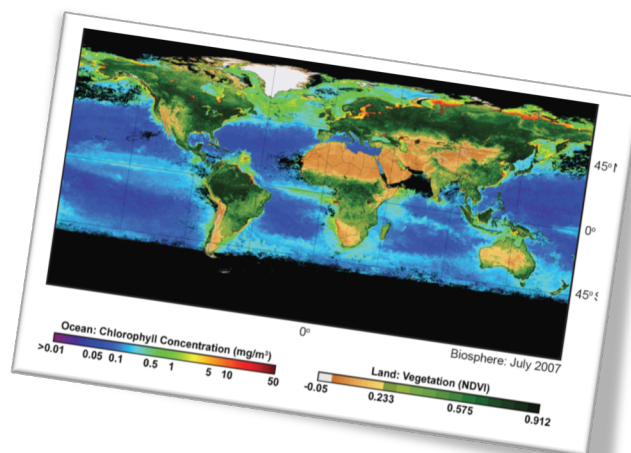
Additional Lesson Plans: <http://mynasadata.larc.nasa.gov/lesson-plans/lesson-plans-middle-school-educators/>



MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

Have students examine Surface Temperature and Insolation animations to develop an understanding of how the Earth is heating, how that changes according to location, and how it changes by seasons. From the data they collect begin to discuss the rotation of the Earth and the role this plays in the unequal distribution of heat on Earth. Next have students study the animations to see what role the oceans play and discuss how the oceanic circulation patterns might affect regional climates as well. Examine animations for different year sequences and see if patterns or changes exist. Have there been shifts in global temperatures or are things remaining fairly consistent? Encourage students to begin asking questions of their own from the data they are collecting.

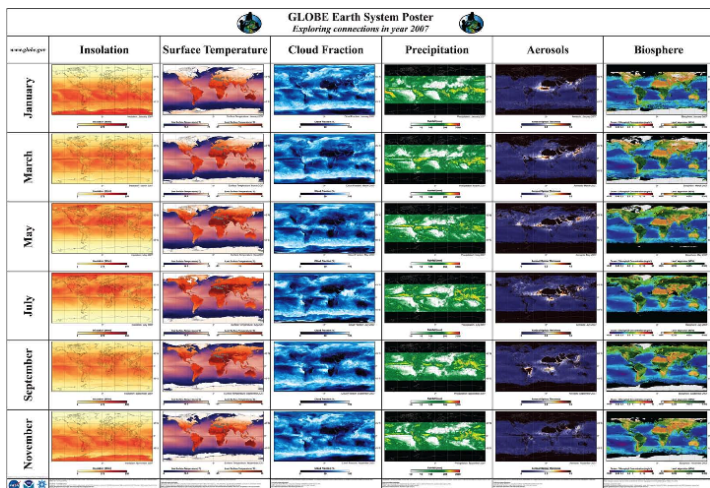
MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.



Have students examine animations for each of the different variables (insolation, surface temperature, cloud fraction, precipitation, aerosols, and biosphere). Working in small groups, have them compare certain variables across different years to determine if changes are occurring. Have different groups concentrate on particular combinations of variables and then compare their findings with those of other groups. Based on their observations have students predict cause/effect relationships for the changes they see occurring. Using the evidence they have gathered in their different groups students should be able to formulate questions that can be used to promote further class discussion of global temperature changes, interactions they see occurring and possible effects this will have on the different components of Earth's system. Guide them to consider the factors associated with human activities that could be affecting the changes they have observed in the animations.

6-8 NGSS Performance Expectations Using the GLOBE Interactive Poster:

MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.		
Science and Engineering Practices Developing and Using Models <ul style="list-style-type: none"> Develop and use a model to describe phenomena. (MS-ESS2-6) 	Disciplinary Core Ideas ESS2.C: The Roles of Water in Earth's Surface Processes <ul style="list-style-type: none"> Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6) ESS2.D: Weather and Climate <ul style="list-style-type: none"> Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6) The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6) 	Crosscutting Concepts Systems and System Models <ul style="list-style-type: none"> Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (MS-ESS2-6)
MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century		
Science and Engineering Practices Asking Questions and Defining Problems <ul style="list-style-type: none"> Ask questions to identify and clarify evidence of an argument. (MS-ESS3-5) 	Disciplinary Core Ideas ESS3.D: Global Climate Change <ul style="list-style-type: none"> Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5) 	Crosscutting Concepts Stability and Change <ul style="list-style-type: none"> Stability might be disturbed either by sudden events or gradual changes that accumulate over time. (MS-ESS3-5)



Additional Resource: [The GLOBE Earth System Poster](#)

This is an additional resource for teachers that have limited computer access in their classroom but still want to implement NGSS by incorporating real-world data in their classroom. It might also be used as an introductory activity for the online digital version. As students become more familiar with identifying patterns and relationships between images they will gain confidence and skill as they are then introduced to the MY NASA DATA animations found in the [Digital GLOBE Poster](#).